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<td>March 20 - April 1</td>
<td>Maldives Islands</td>
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<td>April 4 - April 7</td>
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<td>April 15 - May 1</td>
<td>Chagos Archipelago</td>
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<td>May 10 - May 12</td>
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<td>Port Victoria, Mahe Island, Seychelles</td>
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<td>June 1 - June 5</td>
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### PORTS OF CALL and MAILING ADDRESSES for R/V TE VEGA

All mail and/or shipments should be sent to the Agent's address. Address should include the name of the person, name of the ship, name of Agent and Agent's address. Mark all mail "PLEASE HOLD FOR ARRIVAL OF R/V TE VEGA".

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### A SPECIAL REMINDER

Send all letters via AIR MAIL. You should allow at least ten (10) days for mail to Mauritius and Madagascar.
Some weeks have elapsed since a narrative or indeed any news of general interest has come from TE VEGA. Should any faint-hearted landlubber think that we have foundered, perish the thought, for we are vigorously alive and busy. This is Cruise Bravo, the second of TE VEGA'S three official International Indian Ocean Expeditions cruises. We feel well named, for we've been buffeted a bit by the vicissitudes of fate, but are undaunted. Perhaps before I go any farther, I should introduce myself. I am Dixie Lee Ray, on leave of absence from the University of Washington and proud to work for Stanford as Dr. Bolin's stand-in for this cruise. Dr. Bolin is not aboard for these three months, having rotated home for a well-deserved respite. The scientific party at present consists of a total of fifteen--eight students, six expedition scientists, and myself. We were due to board the vessel in Colombo on the first of February. Knowing of the misfortune of the broken shaft, we postponed this departure time until the fifteenth of February, feeling that that was ample leeway. But we reckoned without the ways of the East. Delay has added to delay. Port congestion and dock strikes, red tape and just plain confusion kept TE VEGA out of dry dock until Friday, the twenty-first. Until then, we lived on board, anchored in Colombo harbor along with the fifteen or so other vessels all waiting for dock facilities. Movement through the harbor here is so slow that most shipping lines have now added a fifty per cent surcharge just to bring goods to Ceylon. And the tragedy of the situation is that cargoes of all kinds are desperately needed here; many, many supplies are running short. Certain foods, textiles, medical supplies, bus and automobile spare parts, repair materials, tires, and so on are either completely lacking or, in order to obtain them, the people must stand for hours in long lines. But these conditions and many others are illustrative of some of the growing pains of independence, and since, in any case, we can't do anything to change the situation, we're
learning very quickly to live with it and to make the best of what we have to do. We have started our classwork. Each student is doing some reference work and preparing the reports on one or another aspect of the physical conditions of the environment in the Indian Ocean area. We have visited a number of beaches and nearby coral reefs, mainly for exploratory work, skin diving and in general becoming oriented into the fauna and marine life of this region. We have had some lecture work, including a fine introduction to the tropical seaweeds by Hal Hackett from Duke University and an interesting discussion of the formation of beach rock by Dr. Louis Kornicker of Texas A&M. In the latter case, Dr. Kornicker took us on a conducted tour of the sandstone formations directly in front of the Gaul Face Hotel, our abode during the time we have been in Colombo.

We have done a bit of sightseeing; we have visited the Fisheries Institute, the Zoological Gardens, the Botanical Gardens, and so on. And since last Tuesday have shifted our operations to the very southern tip of the island of Ceylon where we are now established in the new Oriental Hotel. The proprietor of this magnificent building, set up on the ramparts of the old Dutch fort (the ramparts at least date back to the early sixteenth-hundreds; the hotel is not quite that old) has provided us with an extra room in which we have set up a primitive, but nevertheless effective, field laboratory. From here, we have conducted our first transect across a coral reef and have had at least two very successful fish collecting expeditions ably led by Loren Wood from Chicago. But let's hear what the other members of the scientific party have to say about our activities so far.

Here is Gary Beardsley from the University of Northern Illinois: Many of the students on this cruise are very much interested in fishes, and we were looking forward to setting up a first poison station. Dr. Wood suggested that our first day in Gaul be spent scouting around to locate an area that would serve our purpose. And, to be effective, the area had to be calm, with little current and with enough fauna to yield a
good representation. An ideal area was not to be found due to the large swells that have been hitting Ceylon for the last few days. But we did settle on a protected inlet which, if poisoned at low tide, would serve our purpose. In addition to the larger area which we were to poison, there were also two tide pools which were about ten to fifteen feet wide and about two to three feet deep in the center. Bob and I decided that we would take about a gallon of poison and try to work this area.

Dr. Woods, plus the three other students, Carl, Dick and Jimmy, began to administer the poison to the larger area. This area was about sixty feet wide, narrowing and shallowing towards the northern end, which was almost closed off at low tide. The south end deepened to about twelve feet and opened into a channel which ran around the north side of the Dutch fort. Also into this area emptied a fresh water stream. The poison itself looks like heavy oil; in fact it is mixed with oil, but when poured into the salt water becomes milky. Almost immediately, small fish began jumping clear of the water. Usually the larger fish leave the area, especially the open water fish. We kept busy from about eleven o'clock to one o'clock picking up all the fish, crustaceans, and molluscs. This is one good part of the poisoning. Rather than just picking up fish, we were able to get a good representation. Using poison, one collects many fish which can't be obtained any other way. Many of us were surprised at the number of fish we collected. We had dove here yesterday, but did not see three-fourths of those collected. We ended up with a large garbage can full, most of them being around or under the three-inch size. The rest of the afternoon was spent preparing and preserving the fish. Our station yielded thirty-two families of fish consisting of about eighty-five species. This was my first experience with a poison station and I found it very interesting and am looking forward to those we wish to set up in the Maldives, Chagos and Sayshell Islands. To date, we have visited four reef areas and I am very surprised that the water has not been as clear as
I thought it would be. While in the service, I was stationed about thirteen months in the Mediterranean area, and I guess this spoiled me. From all indications, though, the Maldives should be a lot clearer, and everyone is looking forward to doing diving and collecting in these areas.

This is Robert Robertson speaking. I am Assistant Curator of Molluscs at the Academy of Natural Sciences of Philadelphia. At the Academy, we are engaged in an ambitious project: taxonomic studies of Indo-Pacific molluscs, group by group. The marine mollusc fauna of the vast Indo-Pacific area is far richer than that of any other region. No American museum has adequate collections of marine molluscs from, among other areas, the Indian Ocean, India, the Maldives, and Ceylon. I therefore planned originally to spend one month at the Central Marine Fisheries Research Institute,olkapo Camp South India, using this as a base for collecting in the vicinity. Then I planned to join Cruise B of the TE VEGA. As things turned out, I spent almost two months in southern India, putting the extra time to good use and obtaining a large and interesting collection. I expected to spend only a few days in Ceylon but now have been here fifteen days. During the wait for the ship to be repaired, I have collected, with others of the scientific party, at three localities on the southwest coast of Ceylon--Bowalla, Bellavalle, Nickodaw, and Gaul. I might tell you of some of the molluscan highlights thus far. Both at Bowalla and at Gaul a water trap an epithelium with common under incrustations of a colonial zoanthid (zoolen) . Some of these were partially embedded in the tissue. The therefore must have been feeding on these. All water traps probably feed on plankton. But this is the first time that one has been found with a zoanthid.

Both at Gaul and at Bowalla, soft corals were abundant. And with these, I found a few pairs of Calpurnia Regens. This is a relative of the coralli... with a white... shaped shell with a
Mantle which, when fully extended, covered the whole side. The mantle has grey-black polka dots on it. These beautiful animals feed on soft corals and the family to which they belong, the Oulidae, all feed on coelenterates(?). I found Calpurnia walcosis on top of or at the edge of soft corals. At Gaul, I was very excited to find another Calpurnis--Calpurnis lacteus, this one with a smaller shell and with fine yellowish-green spots on the mantle. This one I found only underneath the soft corals and they could be found only by tearing these up. Also at Gaul, several of us found old broken shells of another phalenterate-feeding gastropod, Rapa rape. This one lives embedded in soft coral. I searched for these above in vain. Thus far, the mollusc collecting prize certainly goes to Gary Beardsley. Diving in twenty-five feet of water off Hickodee, he found a pair of Cyprea argus. This is a rare Cyprea throughout the Indo-Pacific and I'm told it is extremely rare on the Ceylon coast. Gary, I am afraid, is to be scolded for having lost one of the pair.

This is John Garth speaking. Captain Fred Seccombe and I joined TE VEGA at Colombo on February fourth, after three weeks of air travel that included New Zealand and Australia. We left again on February sixth for Mandapan Camp, South India to join Dr. Loren Woods and Dr. Robert Robertson at Central Marine Fisheries Research Institute. While at Mandapan Camp, we collected invertebrates intertidally, spent a day each on a Norwegian trawler, and made a five day jeep trip through South India. Among the places that we visited were Maderat, site of the famed Menatchee Temple, Cortalia, a resort built around a waterfall, Travandram, former capital of a native state, Cape Cormoran, southernmost point in India, where the waters of the Arabian Sea and Bay of Bengal meet, Kodi Canal, a bay station at seven thousand feet in the Nilgeri Mountains, and Periyar, a game reserve with a herd of wild elephants of which we saw about thirty, twenty at one time. After three weeks in India, we returned to Colombo on
February twenty-seventh. Finding TE VEGA in dry dock undergoing repairs, we left again for a week at Gaul for which we visited Dondra Head, southernmost point in Ceylon. As of this date, March 12th, we are back aboard TE VEGA and are looking forward to exploring the Maldive Islands where Captain Zeisenhaedie will collect echinoderms and I will collect crustaceans.

This is Fred Zeisenhaedie, Curator of Echinoderms at the Allen Hancock Foundation, University of Southern California. I arrived on board the TE VEGA along with Dr. John S. Garth and after several days aboard the vessel we left for Mandapan in India to work at the International Oceanographic Station that had been set up by Dr. S. Jones at the Central Research Fisheries Station at Mandapan. While we were there working with Dr. Robert Robertson, and Mr. Loren Woods, I was asked if I would be interested in joining Dr. S. Jones on a tour of the Southern India Fisheries Laboratories. I was very glad to accept, as this was in payment for the tour I had taken Dr. Jones on in Southern California last August when he had been our house guest for three weeks. We were off in one of the Fisheries' vans, a GMC pickup built into a van with seating capacity in the rear and space for carrying equipment. Our first tour was to the city of Madras, there to meet Dr. Rina's of the U. S. Fish and Wildlife Service, Washington, D. C, who is also a participant in the International Indian Ocean scientific cruises, and he is asked to spend his time at Mandapan and adjacent coastline to study the fishes of the Capnellidae family. Our next stop was to the Tuticoran Fisheries Laboratory on the southern coast. There we met Mr. K. Nabir and Mr. N. Pi, along with Mr. S. Mahatian, They are engaged at present in charting the rocky areas off the coast to a depth of twenty fathoms, using aqua lungs as their method of swimming below the surface. The usual procedure is to run over the area with a small boat, the fathometer operating and then come back to the areas of uneven bottom and dive and chart the rocky areas. Tuticoran is famous for its
TE VEGA ROUGH--7

Pearl oyster fisheries and now that they are starting to be the outer end of the world, it is very important that they know that the ocean floor contours are off the coast. On our second day, we drove to Cape Cormoran, the southernmost point of India. There we met a Mr. A. Salma and his assistant Mr. A. R. Nair, who are engaged mainly in fisheries statistics. While we were there, we had lunch at one of the local rest homes and visited a large shrine built in memory of Mahatma Ghandi. There, on the twelfth of February, his ashes were placed for a considerable period and later distributed to various places in India. The 12th of February has become a national holiday to celebrate that occasion. Inside of the large-domed building is a shaft holding the picture of Mahatma Ghandi. Overhead is a light shaft so constructed that only on the 2nd of October, Mahatma Ghandi's birthday, does the sun's rays shoot through the light shaft and bear upon his photograph. From there we traveled to Trivandrum and then drove on the most traveled highway in India to Travandrum, which is the capital city of the very wealthy Karala State, one of the wealthiest states in India. The next day we went from Travandrum to Travesalan Beach. Here we met forty-two units of the Wiley Bayan around-the-world cruise, consisting of Americans pulling twenty-eight trailers with either Ford or GMC pickups. This group had left Long Beach, California in October of 1963. The units were shipped directly to Singapore and from Singapore the caravan proceeded to the Burma border. Here they were turned back and had to retrace their steps to Singapore and charter a vessel for $35,000 to take the forty-two double units to India. They had been visiting in India since the 2nd of December and were very much pleased with Travandrum Beach. The group plans to travel around the world and return to California and the west coast sometime in 1965.

We spoke to Cecil and Mary Poe of Oregon and one of the nieces present was speaking of one famous graduate of Stanford who was also interested in fishery and it turned out to be none other than Dr. Alvin Seal, who
established the aquarium in Manila and also for many years was director of the Steinhardt Aquarium in San Francisco. We also spoke to Mr. and Mrs. Nolan of San Diego and asked them of their problems in traveling cross-country, especially driving on the left-hand side of the road instead of the right-hand. Apparently their group is well organized; scouts go out in advance to find rendezvous places where the forty-two units may park, and their gasoline is ordered and shipped ahead. In order to get the best fuel, they must dilute the regular gasoline with aviation gasoline. We called at the Thinjam Research Laboratory and there Mr. Rasool took us for a tour along the beach front where some two hundred primitive fishing boats, oncas, sailboats, and even catamarans composed of four logs, would go out daily and fish in the bay, mainly with seines and nets. We also had time to stop at the village of Quillan, which is the headquarters of the Norwegian-India projects, consisting of running and fisheries, running provided protected water supplies and many related public health services. The Norwegians have introduced small thirty-two-and-thirty-six-ft-32 and 36-ft. diesel-powered trawl boats and they have opened up a number of large resourceful areas to prawn fishing. From Quillen, we went to the Ornaculan-Kochin area, which is the headquarters for the Central Bureau of Fisheries Technological and Research Group. There is also a head office of oceanography of the Central Marine Fisheries Research Station, and several other units, one the Oceanographic and Marine Biological Station of the University at Kochin and also the Indian Ocean International Expedition Plankton Sorting Center. At the Marine Fisheries at Eraculum, I met a Dr. Al Alpasad graduate of the Hopkins Marine Station. They have an oceanographic vessel, the 90-ft. BALRUNA 2 (BALLERINA?). It is a counterpart of our own NEPTUNIS rex that is employed by the Foundation at Moss Landing, California.
Both these vessels are well equipped with the latest sonic, radar, and electronic equipment, and they are starting a very elaborate program of oceanography at the local post with the vessel. While we were there, we visited one of the many shrimp freezing companies. We happened to visit the Nalabal Shrimp Freezing Co., which operates seventy-eight shrimp trawlers off the coast of Kochin. The shrimps are frozen according to size, the lowest grade being 200-230 pieces per pound and graduated up to where they have one or two pieces per pound. Then the shrimps are frozen in ten pound packages and sent to New York City for consignment.

Thuxxx an equal balance of Dr. S. Jones' Fisheries Research, there is a sister unit called Central Fisheries Technology, which is headed by Dr. A. N. Boys. The technology section is composed of two units, the food processing and quality control, but with that all methods possible means of preparing and preserving fish. The second unit is technological, dealing with types of fishing gear and various designs of hulls and engines for vessels. This group is under the control of Mr. G. H. Puriyam.

We also had the good luck one night to have dinner with Mr. and Mrs. E. B. Plakmar, who is the chief Norwegian of the Norwegian-Indian Project. We visited with Dr. C. V. Piryan, the Director of the Biological and Oceanographic Department of the University at Ornakulan. They are now operating a 40-ft. research vessel, the BRAUNCH CONCH, and are carrying out many projects in the local waters. In an adjacent building we found Director Dr. A. B. Nathan of the Indian International Ocean Plankton Sorting Center. We were given a tour of the building and met quite a number of people who are now engaged in sorting the plankton that has been collected by the AMPTON RUN and various other American vessels.

After the day was nearly over, I still had time to pay my respects to the visiting U.S.S. GREENWICH BAY of the Persian Gulf fleet, maintained in the Persian Gulf to show the American flag. Since
but I was fortunate enough to meet the executive officer, Commander Miller, and have a cup of coffee with him before leaving the vessel. After three days at Ormuculan-Kochin area, we returned to Madurai. By way of the Pyramid Mountains, climbing up the sides of one valley with very scenic country, turning and climbing roads we crossed the main ridge at 3650 feet and continued in the tea plantations to the Haley Burea tea estate where Dr. Jones' brother, Mr. Dennis, is the official tea maker for the estate. There are 320 acres of tea being harvested that were planted in 1906 and 1914. Once a week the new shoots are plucked and only the two tendermost tip leaves are retained. The workers pick the tea and are paid by the pound for their efforts. The tea is then taken to the large three or four story factory and processed through eight different stages that depends more or less on the relative humidity when the tea is being made. So there must be very exacting controls to produce the best tea. The tea, after weighing, is left to wither and then it is curled; then it is sorted, sometimes screened both through a fermenting process which makes it black. It is again dried and then finally grated by being blown through a wind tunnel. We made the mistake to open the last panel and were showered with very fine particles of tea. From the tea estate, we continued on to the Pariyar Gam Sanctuari - Sanctuary but arrived too late to take a boat out on the water to see the animals come down to the shore to drink. But we did observe black monkeys around the grounds and a number of very interesting birds. Dr. Jones had to get back to Mandapan Camp the following day, so we did not have an opportunity to remain overnight. If anyone has not driven in India, he is in store for a treat. Not only do they drive on the wrong side of the road, but it seems if there's anything to be done in India, it must be done on the center of the road. To aid in hulling the rice crop, rice is spread on the road in hopes that the passing wheels of automobiles will help hull the rice. If washing has to be bleached, it is usually placed in
the center of the road. Along with the rest of the competition, were many busses and heavy lorries that occupy the center of the road and do not like to give up the right of way to overtaking cars. The slow bullock and ox carts also favor the center of the road. In addition to these, there are horse carts, there are push carts, there are hand carts, there are head bearers; then we have large herds of cattle, of caribou or the water buffalo, flocks of brown sheep, flocks of goats, sacred and stray cows, stray burros, wandering pigs, the very, very religious men who that hear nothing and see nothing and fail to yield the way, plus chickens, turkeys, and of course, many children. It is like driving through a wall of living flesh. The most important part of the car is the horn. And, it seems after constant blowing of the horn, just as the car approaches, a way is made in the flesh and the car passes through. The penalty for hitting any of the above mentioned animals usually results in the local natives catching the driver, taking him out of the car, and beating him up, in some cases beating him to death. As a result, there is quite a bit of hit and run driving now. Rather than being beaten up, the driver takes his chance and drives away, which also is not the proper thing to do.

We had our little experience when we came to the town of Chitkarmanar, a little Hamil Indian community some thirteen miles from Maduri. I had been sleeping at the time and was awakened to find the car surrounded by several hundred white-clad Hamil natives who bodily picked up the pickup truck and carried it back to the site where the elderly gentleman, a Hamil, was struck. There was quite a bit of commotion. At that time it would have been rather easy to upset the car and throw a little match into the escaping gasoline and it would have been quite an incident. Dr. Jones was on hand and immediately got in touch with the leading men of the community and after discussing the problem, the Hamils wanted one hundred rupees as damage. And Dr. Jones convinced them that the proper thing to do was to go to the police station, which we did.
and spent some two and a half hours while we were there. Finally the head inspector of the district was brought in to interview the gentleman who at first faked that he could not hear. After talking for some time and getting no result, the crafty inspector spoke to one of his sons, and said, "Your father is an old man, he probably will die, he will not live very long, so better we get a big knife and cut him open and see what is wrong with him." Upon that statement, the old man regained his voice and began to talk. The next process was to get the gentleman into a hospital. And again, the old gentleman refused to go to the hospital; all he wanted was his one hundred rupees for his damage. So the inspector said, "Since I am not a doctor, I do not know much about medicine, the only way I can tell where it hurts you the most is to get a big stick and commence beating you. And when you holler the loudest, then I know that is where you are hurt." Well, after a few minutes, the old gentleman agreed that probably it was best we go to the hospital. So we loaded the gentleman in and several of his sons drove thirteen miles into Madurai, got to the hospital and spent another two and a half hours waiting for the doctor's decision. After an inspection, it was revealed that the old gentleman had nothing more than a bruised foot. Apparently, according to the driver, when the horn was sounded, the elderly gentleman cleared the road and just as the car turned around and stepped into the path of the automobile. The driver swerved; although he hit the gentleman, the tire just ran over his foot. So out of the window went the idea of getting the one hundred rupees and the doctor said he would look after the man. But since we had to go to the police station and report the incident, we also had to take the car the following morning to the inspector to be sure the car was in complete running order, which we did and the car passed the examination first class. For an American, driving on the Indian highways with all the traffic and all the excitement this one night that the families picked up the car and walked away with it
will be the one that shall be remembered. We did, however, return to Manda-
pan Camp at noon the next day in order for Dr. Jones to finish his business
and make his appointments. But the night at Chitharamanar will be one to
be remembered.

This is Loren Woods, Curator of Fishes at the Chicago Natural History
Museum. I came to the TE VEGA by way of the ANTON BRUN, a cruise in November
and early December, and Mandapan, where I expected to stay from mid-December
until the TE VEGA was ready to sail from Colombo on February 1st. As it
turned out, the stay in Mandapan was much longer than that, and so I made
good use of my time collecting fishes all around one small island that lay
out in the straits between India and Ceylon. There were several reasons
for working on this one island. One, it was well offshore so that the
fishermen who depend on the shore fishing for their beach seining and
their living could not say that our poisoning had any effect on their
livelihood, they blamed any new thing, any system of fishing such as
offshore otter trawling, on their poor, uh they blame their poor catches
on this. So, I worked all around this island and was able to get a very
good and I think fairly complete collection of the fishes that live there.

There had never been Roatnone used around Mandapan Camp so that many
of the fishes that we caught were either quite rare or were unknown to the
fisheries people at the station there. Before I go on, there is one
thing that I should say in connection with Zeisenhenie's tape concerning
Rinjas, who is here studying the Lepidae. I arrived in Colombo, along with
Zeisenhenie, Robertson and Garth, toward the end of February and the next
day was able to go out, with some of the enthusiastic students and one
of the local divers to the reef just south of the Gaul Face Hotel for an
afternoon's diving. The reefs here are mainly sandstone with very little
live coral growth, but the number of fishes was tremendous. Many of
them are quite used to divers so that they're fairly shy and, whenever
the diver is near them, they hide under the ledges and in holes so that
it's necessary if you want to even see them to pull yourself down and
look under all of the ledges and rocks in order to see the variety of butterfly fishes and angel fishes that normally live there. It's been possible, too, to make some observations on the fishes, things that are well-end of tape #1 known, but things that we were on special look-out for, things to show the students. One of these was the habit of trigger fishes when they're chased of ducking into a hole, generally a small one, where they lock themselves in. At Bariwalla, there were very small trigger fishes just outside of the breaking waves in the beach area and here the pebbles the triggers got into were small enough so that you could actually pick them up with your hand and then up above the water loosen the trigger or shake the fish out. We were able to see the pair-of picking wrasses, labroides that were present on the reefs in large x numbers. The fishes come to them and posture in order to have their parasites picked and none of the fishes are particularly shy when they're in this vicinity and least of all the wrass because if there are no fishes to be picked, why it comes and will pick on the diver's legs. Also, there were large lion fishes. These have been pointed out to several of the students and one has even been collected. These, like so many of the other fishes that are here, constantly are pursued by spear fishermen, will hide under the rocks. The ceridids are fairly abundant and these will cling to the edges of the rocks and work their way up and down. Another thing that we have seen in large numbers were the goldfishes feeding the patches of sand between the coral rock. These actually push the small pebbles out of their way and rub with their clarval the space that the rock had occupied. In Hicadua, the goldfishes were accompanied by yellow snapper that moved when they moved from place to place and hung right above them. I don't know whether there to dash in and pick up any supply of food, or just for company. At Gaul, too, while we were diving, and looking for an area to poison, and in the area that
we finally did treat and collect all of the fishes from, there was a good supply of gobies living in holes in the sand, some of these living with digging shrimp, so that by lying at the surface we could watch the digging and then as we approached, the shrimp would disappear, but not until after the gobie had gone down the hole. In our collecting with Roatnone, we've been able to gather several fishes that I think are not reported from here. One of the most interesting to me was a little calixadities. I don't know exactly what it's distribution is, but it isn't in any of the common reference books that we have of this area, although it was reported from the Marshall Islands. In our diving at Hicadua using SCUBA, we went offshore in two outriggers through the surf and beside some tall granite spires. Actually, they seem like rather short granite spires till you go down into the water some thirty feet and see the sheer walls that these things have and the depth from which they rise. Here the currents were fairly strong, and by just letting these currents carry us through the channels, we were able to approach schools of fishes, particularly small chromis with a brilliant yellow tail, and in the quiet openings in the coral there were large schools of apiganets. Also, at some thirty to forty feet deep, by peering into the holes and crevices, we saw squirrel fishes, mirprissis and holofentris and under the ledges here were large schools of harvest fish. This is an extremely abundant fish on all of the reefs here but generally in a little deeper water or in the more open parts of the reef where the surf is actually breaking so that you have to get under that surf in order to see the fishes. Another one that I had never realized how abundant they might be on the reef were the monotaxis, the small monotaxis. I haven't seen any large ones so far, but the little ones with the bright yellow spots on the side is also very abundant. Diving at Hicadua, too, we saw generally in the distance schools of black bumphead parrot fish with a grooved tail, very
irregular tail. Some of these were quite large, possibly up to three feet long, but perhaps this is an exaggeration due to the magnification and maybe they were only two feet long. We only saw one barracuda and no sharks. Three of us had cameras and some that were taken by Carl have already been printed so that they turned out fairly well, although he isn't pleased with them at all and hopes that another roll will do much better. One of the most surprising things that we've seen on the reefs is just the great variety of fishes that are living there. Many of these are fairly curious so that they come out of their hiding places if you don't approach them--if you're just swimming or drifting by--and you're able to see them and tabulate them. There are half a dozen or more kinds of butterfly fishes which are always in evidence and I've been constantly surprised with the number of [comacentradae] and of [acanthuradae]. The [comacentridae], of course, and the holacentridae, many of these I have never seen alive before, although many of the small butterflies have found their way to the aquarium in Chicago and some of them, of course, are found in Hawaii, so that I've seen them swimming on the reef there. But actually we haven't spent enough time or taken enough time to stay in one place and observe the fishes to see what they are actually doing beside watching us and hiding or getting out of our way. We haven't yet become part of the landscape. Perhaps, because there are so many skin and SCUBA divers around and because the fishes are chased so much, that they are rather shy and will run and hide as soon as they think they're in any danger. We hope we're hoping that the fishes in the Maldives are much less sophisticated so that we can make additional observations. The students have been trying to learn the families by going over those that we've collected and in order to help with this, we visited the fish market in Caun on several occasions and picked up just a scattering of the different orders of fishes that represent the different orders, and these
have been brought on board and between here and Mali we will probably spend some time learning the characters of the different orders and pointing out some of the distinguishing features of the families, although a number of the students who haven't an especial interest in the fishes have already learned the families just from seeing them again and again, and because some of the names, such as butterflies and angels, are fairly common, things they've known a long time. But we do hope to pin some of these characteristics down and we probably will be collecting a wider representative of orders than we have now. One way that you could help us, Rolf, would be to make sure that there is an additional supply of Roatnone awaiting us in Kochin because otherwise I think we're going to have great difficulty with some of the students keeping them satisfied with the fishes that we could catch in the nets. Another thing that I do have to mark add--when I said "harvest fish" I meant pentharids.

This is Hal Hackett. I'm a graduate student in phycology, or algology, whichever you please, at the Department of Botany, Duke University. I'm a native of the state of Maine, which might account for any Down East accent you might detect. I'm here filling the position that was to be occupied by Dr. Cameron. He was unable to come. There must have been a frantic search to find someone who wasn't doing much of anything. Whatever the circumstances, here I am and very glad of it. There certainly were times when I didn't think I'd get to Colombo before the boat sailed, even with the delays. All I really wanted to do on the way from Portland to this pearl of the East was to visit the temples of Upper Egypt. Well, there was such confusion with my visa that I decided to stop over in Greece instead. So the plane to London had to stop in Ireland because of fog. Thus, I missed my flight to Athens by only a few days. Dublin and London are nice, but I'd packed for a warmer climate. I did finally get to Athens for awhile. But, next of interest was the flight from Greece to Egypt. I won't mention whose national airline was involved, but I
doc... if I'll go back to Egypt again. It was a simple problem. Once airborne, we flew to Belgrade, not Cairo. Yugoslavia's nice, but Air Ceylon doesn't stop there. So I did get to spend some time in Egypt after all. Of course I'd missed the other plane. Pyramids are hard on folks in their Sunday suits, especially when the lights go out just as you reach the burial chamber. I emerged two hours later. Tourists are of course left to their own devices under such circumstances. I had a new suit made here in Ceylon.

As ship botanist, I might give something of the total picture of the island's vegetation. Most interesting are places in the high south central mountains covered with grass and *airaceous* shrubs. They're not unlike the much disputed *tall(?)* of our own southern Appalachians. Much of the cooler slopes are in the highest grade of tea. There seems to be five or six degrees of quality of the tea grown here. Most of these are readily obvious, but moving down a slope, apparently the quality goes down also. In the vicinity of the old seat of the *Candian* kings, the extensive mixed cultivations of rubber, tea, coffee, cacao, bamboo and cinnamon give a heavily forested look to the mountain roads. It's indeed very beautiful. Betel is grown here also. Evidence of its use has stained the streets of Colombo red. Nearly all of the lowland, at least on the southwestern side of the island, is in yellow coconut on the higher and dryer sides and of course rice on the lower sides. The yellowish mud is still turned by a line of men working in perfect unison alternating the hoe from one hand to the other. The north and east portions of the island experience a long dry season. This area is in a more or less natural state of thorn scrub, trees with patches of grass, mostly acacia and a large flowered *cascia* just now coming into bloom. *Lantana camara* is a common shrub here. In the wet lower areas, there are some *pin* plantations of teak, especially near Amaranapura. Most of the island's beach
strand has been cleared for cocos. On occasion, you can see patches though of Thespesia and what might be Pisonia and Tonafouria. Of course the Acomaya Pez Capri is here. These are much smaller than the West Indian form that I’m used to, though. Super littoral and littoral zonation is not particularly distinct on the grenetic rock coast. We did select a spot in Gaul in a protected region which showed a fairly distinctive black zone and a littoral red zone. Neither of these was occupied by any microscopic algae but rock samples were taken for future study. The sub-littoral algal situation seems to be one of a changing season, a rather poor and highly epipithet flora. I’m surprised of the lack of such genera as Dedodis and Penicillus. Halimeda is everywhere common. Pedina, cygassum, genia, anthaura, Calurpa and grassales form the vast bulk of the total species. The most striking member of the flora is an occasional clan of Halimania dardali in the shallows. Such plants were quite visible even from the top of the city wall, the shallows down at Gaul. It’s apparently nowhere very common though. On the bottom of one of the chunks of coral brought in, I was very pleased to find just five plants of a minute adatabula. Well, other than that, Dr. Robertson raided the Calurpa beds for the elusive Berthalinia, but to no avail. This is the day we sail. As usual the idle curious have gathered on the dock. The other day, events were of such interest they set up an ice cream stand. Among the onlookers is a gentleman with knees pasted on his face. He’d like to sell us last week’s newspaper. He has today’s dailies there.

I’m Bob Wallace of Vanderbilt University. I plan to study the vertebrates of the Indian Ocean. Of course, the mammalian life here is somewhat limited except in the areas of the larger islands, so most of my work will be done with fish and birds. So far, I’ve been working under Dr. Woods of Chicago in fish. We’ve done quite a bit of poisoning
with Rossmore as Gary has mentioned and we've done some skindiving and spear fishing. So far, most of what we've gained here has been of a taxonomic nature. We've done some identification and noted some of the more interesting characteristics of each of these fish. It has been very interesting to notice the ecological habits of the different species. Some are concentrated solely in sandstone reefs, while others in coral reefs, while some fish seem to inhabit all shallow waters. The fish we will take in the deep water, of course, will be quite different from these. Collecting procedures will be quite different also. We plan to use trawls, nets, and lines here. We do have one hope here and this is to collect a 

\[ \text{citilican} \]

and this of course will have to be done with deep water apparatus. The citilicans so far have been taken off the coast of Africa. We will be in the area of Mauritius and Madagascar, and it may be possible to take one here. We hope so. Several of us also have been making some personal collections and we plan to send these back to our respective universities. These will be at least representative families of the fish found in this area. As I mentioned also, we'll be concerned with the bird life of the area. For collecting purposes here we have a sixteen gauge polychoke shot gun using No. 6 and 7 half shot. These should be sufficient for most sea birds. Dr. Woods has explained a method of taking sea birds in this respect. This is to extract the liver, let it decay, at least partially, then spread it across the water from a skiff. The skiff is immediately reversed and the path is retraced. And usually here you'll find great hordes of sea birds hovering nearby and this of course should facilitate our collecting somewhat. Also, I plan to make, as best I can, some \[ \text{notes} \] from some available \[ \text{notes} \] I have here. For collecting some of the smaller birds on the islands. The month we have been here has been an extremely interesting one, and although most of us will miss the old gentleman with leaves on his face, I for one will
be very happy to get underway. Our first stop will be the Maldives Islands which we expect to reach in a matter of a few days. The water here is expected to be clear, and the fish plentiful, and we even have one description of a sunken treasure. So, if the sharks and Maldivian fever don't interfere, we do expect our visit there to be quite a successful one.

This is Timmy Wilcox, one of the eight students on the ship and a graduate student at the University of Michigan. My personal interest in this trip lies in gaining a general knowledge of the invertebrate life of the Indian Ocean with particular stress on the ecological relationships. Since I've been here, I've decided to put stress on the molluscan fauna with the rather capable aid of Dr. Robert Robertson. I believe that the other members of the party have described rather adequately the student and professorial activities here in Ceylon, and in my talk, or installment, I would prefer to describe in brief survey my journey from America to Ceylon, which took me a month and a half, and also to conclude several fleeting impressions of Ceylon. On January 3rd, I left from New York City on the FRANCE, the newest and the only steamship which the French Line now operates, and for five days lived more like a vegetable than anything else, eating, sleeping, and reading on this rather plush, extravagant ship. Perhaps the most enjoyable part of the trip for me was learning to dance fox-trot on a rolling and pitching dance floor. Sometimes all you had to do was maintain your balance and you looked quite graceful. I stayed a week in London and then went by train to Paris, then to Munich and to Vienna. From Vienna, I flew by airplane to Istanbul, from there to Beirut, then Karachi, then Bombay, and finally to Colombo. During the trip throughout Europe, I was quite struck by the much more thorough cultural background of educated Europeans when compared to Americans. This, I think, is no fault of Americans, simply because there is far less culture available in America. There were museums, the theater,
and opera everywhere in all of the European cities and the problem was to see even a small part of the culture available. I think for me the most enjoyable thing I saw, or things I saw, were the Rembrandts in the National Academy of Arts in London. One slightly different aspect of culture is the wonderful cabarets and nightclubs. There are few things more enjoyable in my memory than dancing in the Caves in Paris, or the large dance halls in London where even respectable girls can come and not be ashamed of it, and dancing in the student hangouts in Schwabing, a portion of the city of Munich. It was here that I had the closest contact with the people of Europe, I think. The last statement may be taken as each person sees fit. I did have a wonderful time talking with the students, and found them very enthusiastic and interesting. There were certain problems, however. For the first time in my life, I found myself dependent primarily on my knowledge for communication, not the knowledge of others. I found this somewhat exasperating, but very exciting, and I thoroughly enjoyed it. One of the more enjoyable parts of the trip was eating the various foods in each different city. I found London's food to be such like those in the United States. However, in France and Germany, the excellent cooking and imaginative flavoring made mealtime a high spot during the day. I had great fun sampling the various pastries along the streets in the shop windows and in the restaurants. I must say I was less enthusiastic about the curries which we now sometimes eat in Ceylon and which I ate for a week in Bombay. The most interesting things for me in Istanbul and Beirut were the strange street bazaars where you find everything from peanuts to elephants sold, and where the unbelievable melee of people, colors, smells, sights of all sorts stagger your senses. My most graphic memories of Bombay and Colombo will always be the thousands of people, the beggars sleeping in their own filth on the sidewalks during both my day and night. When I first saw these people,
it seemed to me that they possessed a certain kind of pride, but now, now after I have seen them for a longer time, it seems to me that this pride takes the form, instead, of a desperate and despairing hope for the future. I say this because there seems so little hope for them in the present.

I also ought to mention the tremendous impact which the death of President Kennedy had on the whole world, at least the world that I've seen during the last month or two. People from all walks of life, beggars, taxi cab drivers, officials of various sorts—all these lamented from their hearts the death of this man. President Kennedy was sincerely loved and respected in all of these countries. In fact, I'm ashamed to admit it, but I now believe that John Kennedy was more appreciated outside of his own country than within. I've been here in Ceylon now just over a month, and I find it a completely beautiful country. I appreciate as much as anything the amazing childlike quality of many of the country people and also the down-to-earth common sense of others, especially those in the cities, for here there is a greater percentage of educated people. I like the Ceylonese very much, and I think that our delay here has been fully to our advantage, for it is only by being here this length of time that we have been able to appreciate, to come to comprehend, the way of life of these people.

The parts of Ceylon which we've seen have been rimmed with dazzling white sand beaches, the organic outrigger canoes lying on them, and there we see too often the continual struggle of poor fishermen who toil so hard to catch fish and the results of their labor fleece the pockets of the middlemen who sell the fish in the market with a little shouting. In the inland regions, we saw many lumber yards where men saw large planks of lumber by hand. And we also saw extensive rice paddies, tea plantations, and coconut plantations, although most of the more humid parts of the island possess coconut trees everywhere, whether they are on plantations or not. We find the economic conditions of Ceylon to be completely
appealing, at least on American standards. Here, at least for tourists, the black market appears to be much more common than the official channels, and especially for the people in the cities. Honesty too frequently means poverty and empty stomachs. During the second week of our stay here the student complement on the ship made a trip through the southwestern portion of Ceylon passing through the cities of Anarantapura, and Sigeria, then down through Candy and back to Colombo. I think it was here that, for the first time in my life, I felt the impact of an ancient civilization on present time. For, in this region, there once flourished a civilization which apparently more than rivaled that of the Aztecs. This is the ancient Senalese culture which began apparently around 400 B.C. and which died about eight hundred years ago. It gave me a strange feeling to see the jungle growing everywhere around these cities, and to know that once this was a wealthy cultivated land. Between Anarantapura and Sigeria there are sixty miles of jungle. I was told by one person that at one time a person was able to walk from rooftop to rooftop between these two points. The ludicrous comparison to this now is merely from treetop to treetop. The only remnants which now remain of the Senalese culture are the jungle grown monuments which very strongly bespeak the once magnificent culture. Somehow the ancient temples cry out aloud of their past. This feeling never left me on the trip, and it made me wonder how the downridden conditions of much of Ceylon today could have come about after such a glorious history. I guess the story of the Roman Empire gives us the answer. If I shall be very sorry to leave Ceylon. I feel as if I'm just beginning to understand its people. On the other hand, we all look toward the Maldives Islands with a wistful longing, and it looks as if we finally may sail for them.

This is Carl Henry of the University of Washington. Since leaving the United States at the end of January, one and a half months ago, I
I've been to many places, and seen many things from picturesque to grotesque, and have been interested in it all. Sometimes as a tourist, sometimes as a customer and most of the point of the trip, sometimes as a student, the Orient has provided many thrilling, profitable, and useful experiences.

My flight to Colombo originated in Seattle, with stops in San Francisco, Honolulu, Tokyo, Hong Kong, Bangkok and Singapore, a very brief, but fascinating glimpse of the Orient. The East now seems less mysterious, but I even more hope to spend more time in some of the places I saw only too quickly. In Tokyo, I spent most of my time shopping for cameras. I got some good buys, for example a Nikon F with f14 lens for $145. I hope to see the rest of Japan eventually. I also did a lot of window shopping in Hong Kong, a city of fascinating shops filled with bargains. My wallet is happy I was resistant to most of the bargains, but I'm not.

In Bangkok I remember as a city of magnificent Buddhist temples, saclim-clad monks, big open-air markets selling food, pets, clothes, everything under the sun, and full of some of the most friendly and polite people I have ever met. Bangkok is a city I must get back to. By the time I reached Singapore, the tourist in me was close to satiated. I saw no temples, avoided the Tiger Bond Gardens and spent all too much time in the comfort of my air-conditioned hotel. This was only my third or fourth day in the tropics and after a few hours in the sun, I became extremely pooped. I did take a boat trip to the harbor and investigated fish traps supported on poles in the Indian Ocean. The previous night I had had my first collecting trip—a short visit to a rather barren beach next to a suburb of Singapore. Some weathered algae, anthro- pods, and a few small snails were all I found. Even though it was night and almost high tide, it was very exciting to wade in the Indian Ocean.
I met Mary Rice in Singapore, and we proceeded to Colombo together. The first night here was absolute hell, as we foolishly decided to move directly onto the ship. Things must be done more slowly in the tropics. The next day would have been much easier.

The last month I have explored Ceylon from the old capital of Anuradhapura, a city of three million inhabitants twenty-five hundred years ago, to the first station of Cruise Bravo on the reefs of Cauvi. The highlights of our Ceylon sojourn have mostly been covered by my fellow students, but I would like to add a word or two about a place several of us visited in the first week. Seven miles out of the main center of Colombo in the suburb of DediviJa, the government maintains the most beautiful zoo I have ever seen. It is not the largest, but there is a very large selection of beasts from the Orient and Africa and including some from North America. The landscaping is magnificent.

I do not know all of the vegetation, but the effect is breathtaking. Brightly colored flowers, broad-leaved trees, all the luxuriance of the tropics—and the animals are displayed in very neat, clean, and appropriate quarters. The undulates have large enclosures to wander in; there is a large pond featuring many water birds, storks, cormorants, swans, ducks, etc. And of course, there are elephants. (something blanked out here on the tape)—-to prove it. Those of us who weren't riders also participated by photographing the more adventurous students. After the ride, we watched the elephant dance. They had about seven pachyderms lumbering about, not very gracefully, but well worth the visit. They also did tricks, like lifting a keeper up by the head. I applauded that, but not for the elephant. One of the more colorful aspects was the rest of the audience. About half wore saris, all in many, many glorious colors. All in all, the visit to the zoo visit one of the most interesting aspects of my Ceylon trip.
I am Hans Kuehntschger from Switzerland. Yesterday, the officers, the crew, and the scientific staff held an open house for the representatives of Ceylonese science and for our interested friends. Therefore, some of the students have had the pleasure to bring the invitation for the open house of our good TE VEGA by taxis to different persons. I and Mary had to bring the invitation to the well known, now retired, zoologist, Dr. Paul Daraneeeyagalla. A servant received us and let us in a large room. Through the open window we enjoyed a look in the garden where a lot of tropic flowers were in full bloom. Even I could observe some beautiful three-colored (?) parrots. This place reminded us rather of a room at the British Museum than of the working place of a modern naturalist.

Dr. Paul Daraneeeyagalla welcomed us warmly and told us about his beautiful time as a student at Harvard University and about his very fertile scientific work. He had not only worked on the ancestors of elephants, lions, and Homo sapiens, but also on systematics and biologic of reptiles and fishes and besides he is very keen on painting and sculpturing.

We were deeply impressed by his humanity and that it is possible to work so successfully in so different fields. After some cups of tea, we said good-bye to this most interesting person. I enjoy this cruise. I will take profit from this cruise for my whole future. I am very glad to be here.

This is Mary E. Rice, a graduate student at the University of Washington in Seattle. My field of interest is developmental biology of marine invertebrates, particularly of the group Cypneulitta. As a student on Cruise Bravo, I would like to describe briefly for you our first class project at Galle, Ceylon. Here, at Station No. 1 of this expedition, the students cooperated in transect studies of the fringing coral reef which extends along the southern shores of the island of Ceylon. This was the first opportunity for many of the students to observe a living coral reef.
Much interest and enthusiasm was displayed as this new and exciting community was revealed to us. The area we chose for the study was located at Triton Bastion of the old Dutch fortification in Gaul. Here our transect was laid out, extending from the walls of the fort through a shallow lagoon no deeper than three and one-half feet, out to the edge of the reef, a total distance of seventy-seven meters. It was our intention to extend the transect over the edge of the reef, but the strong surf and current proved too dangerous for our divers to negotiate. Thus, our study was terminated at the edge of the breakers. The lagoon between the shore and the reef, was under the influence of some current and here we found much coral rubble which had been colonized by a variety of flora and fauna. Most abundant were the alga, Halimeda, and what were probably two different species of phylanthids. The zoanthids formed colorful patches, varying from light browns to bright emerald green, and robin's egg blues. Several holothurians were found in the sand with the rubble. The most common was the black cucumber Holoferia atra, and the most spectacular was a species of Uacta, a mottled black and brown cucumbers which was extensible to a length of more than two feet, and moved in a rising serpentine fashion. The natives warned us not to touch these animals and we soon discovered the basis for their fear. The numerous, tiny, opticles or stipules of the cucumber adhere to one's skin on contact, resulting in a definite pricking sensation—unpleasant, but not particularly painful. Here in the lagoon there were also to be found large colonies of soft coral, brown, yellow, and green, reaching at times the diameter of several meters. As we approached the edge of the reef, we found increasing numbers of hard corals, forming a solid and continuous mass. We marveled at their variety of form and intricate beauty. There were a profusion of staghorns, soft corals, and the more rounded and flattened drained corals, each with its own associated fauna dwelling within the
protected crevices and caverns of the coral. At the edge of the reef, where the heavy surf continually washes, there were well worn coral olders, apparently lifeless. When broken open, however, with a pick or hammer, one discovered a fascinating community--END OF TAPE 2
Long after dark on June 9th I arrived in Mauritius to rejoin TE VEGA after having been tending to shoreside business during her third cruise. I arrived with the hope, although hardly the expectation, that we might sail on the 10th. It was as I should now have expected it to be with ships--delay for the new generator motors to be installed, delay for parts for the refrigeration system to arrive from the United States, delay while attempting to find gremlins in the radar, delay for this and that, a total of two whole weeks of delay. However, it was not without some recompense. As the work progressed, the ship slowly improved and reached a condition not equalled since she left San Diego almost a year ago. Furthermore, the wait permitted contact with ANTON BRUUN, another American vessel working with the International Indian Ocean Expedition, which came into Port Louis during our stay. We were able to renew friendships and exchange ideas and gossip with her personnel. Finally, the delay gave me a chance to see something of the lovely island of Mauritius.

Through lectures that I gave to the Royal Society of Arts and Sciences of Mauritius and to the L.S.U. Alumni Association (Louisiana State University has about thirty graduates on this distant sugar-rich island), I gained a number of new friends who vied with each other to show me around Mauritius. Four or five sight-seeing trips allowed me to get an excellent impression of the entire small island, of the coral-rimmed coast, of the spectacular sheer mountains (one of them with a gigantic balanced rock on top, like a golf ball on a tee), of the rich sugar fields (some of them wrested from old lava flows by piling the boulders into huge pyramids at a prodigious cost of labor), of crowded towns with a bewildering mixture of European, Asiatic and African people and customs, of very British teas in the afternoon and very French dinners in stately homes at night. Best of all was a trip to one of the forest reserves under the guidance of the eminent botanist Dr. R. E. Vaughan, who showed me what Mauritius must have looked like in the days when the dodo was alive, and who helped me collect a dozen native orchids for the University of California Botanical Garden.

At last, on June 25th, we set sail from Port Louis and by next morning the spectacular peaks of Mauritius were no longer to be seen. After a somewhat rough crossing we entered Tamatave, the main port of Madagascar, in the afternoon of Sunday, the 28th. The scientific party had already departed for Nossi Bé to work at the IIOE laboratory there, pending our arrival, so we crated and loaded supplies on Monday, and sailed on Tuesday morning. By about noon on Friday we had come in through the beautiful entrance to Hellville, catching a few tunas and mackerels on our trolling line on the way, and dropped anchor off the town with
the totally undeserved name. As it turned out, the laboratory was on the other side of a peninsula just east of Hellville and we did not see it on our approach. It took considerable time to locate our people, but in the afternoon the ship moved to an anchorage off the station, and we went ashore to inspect the dugong in a large laboratory tank, the pet lemur, the chameleons and other interesting local animals.

The scientific party had been busy while awaiting our arrival. The immediate vicinity of the laboratory provided a plentiful supply of *Periophthalmus sobrinus*, the mud-skipper, a small fish that spends most of its time out of water. Agile and fleet as lizards, they are practically uncatchable in the daytime without an inordinate amount of physical exertion, but at night they fall easy prey to humans armed with flashlights. These half terrestrial, half aquatic animals presented many intriguing problems, and Dr. Malcolm Gordon, leader of the group, had led his people in a concentrated attack. They had carefully recorded many behavioral observations and had measured body temperatures in the field, they had studied water loss in the air in sun and shade, had determined the upper lethal temperature, had investigated body-weight changes on transfer from fresh to salt water, studied the blood concentrations in water of different salinities, measured the metabolic rate in and out of water and taken electrocardiograms to determine differences in the heart rates in water and in air. In short, they had been putting *Periophthalmus* through the physiological wringer, and they plan to do much more with the beast.

The crab, *Cartisoma carnifex*, another marine animal tending to develop terrestrial habits, also appeared to demand attention and had been getting its share. Dr. Warren Gross and Dr. Robert Lasiewski had been busy subjecting this form to salinity stresses, and had run a series of blood and urine analyses in order to elucidate the mechanisms of osmoregulation.

On Sunday, July 5th, some of us turned our attention to fresh water in an attempt to collect some cichlids. Dr. Trewavas, of the British Museum, had requested specimens of these fishes from Madagascar for anatomical investigations of the relationship between the ear and the swim bladder. Present knowledge indicates that such work would clarify the evolution of the family and perhaps point to the derivation of species in Madagascar from either Indian or African ancestors. In the hope of pushing back this particular segment of the border of the unknown, Paul Rudy, Don Raidt, Kelly Blackburn, Steve Gann and I, armed with a 25-foot seine, dip nets and rotenone, set out in a Land Rover belonging to the Nossi Bé laboratory. We went to the lower reaches of a small stream some three or four miles distant, and found a lovely spot of riffles and pools. In spite of
the fact that we were careful not to go into water deeper than the top of our boots, due to the abundance in fresh waters of the area of Schistosoma (a very unpleasant little blood fluke causing a serious disease), we managed to make an interesting collection of eight different species of fishes. Unfortunately there was only one very small cichlid in the lot, and we hope to try our luck again at a later date on the mainland of Madagascar.

A dividend from this expedition consisted of two specimens of a portunid crab which survived the poisoning without any difficulty. These intrigued Drs. Gross and Lasiewski no end. When a physiologist finds an organism of a marine type living in fresh water or terrestrially, he immediately wants to subject it to all sorts of indignities in order to determine what makes it tick in its unusual environment. These two specimens were put through the mill, and the scientists have demanded more of the crabs.

The work continued while a great assortment of gear was moved on board and instruments set up in both the wet and dry labs. Soon the entire complexion of the ship was changed. Centrifuges, osmometers, pH meters, respirometers, a refrigerated aquarium, precision balances, vacuum distillation apparatus, etc. etc. blossomed here, there, and everywhere. A large tank six-by-four-by-four feet in size was assembled and secured on deck, and a pump was installed by means of which we hope to be able to pump water from below the thermocline. This tank is intended to hold Latimeria chalumnae, the famous coelacanth fish that has brought us to this part of the world.

At last, on July 9th, we set sail for the Comoro Islands, and, with the aid of dramamine, managed to survive a rough trip across the Mozambique Channel. People had a hard time staying in their bunks, and they complained that it was the first time they had retired to become fatigued rather than refreshed. A small table in the mess was broken by one of the students being hurled against it, we took considerable water over the decks, a few things managed to come adrift in spite of being lashed down, but no critical instruments were broken and there was surprisingly little seasickness.

By the morning of Saturday, July 11th, we were in the lee of Anjouan Island and soon dropped anchor off the town of Mutsamudu. On going ashore to take care of entrance formalities we were immediately struck by the Arabic character of the town. Crowded, flat-topped, stone houses with steep stairs to the upper floors; crowded streets that were simply narrow alleys impossible for wheeled traffic, veiled women peeping through narrow slits at the strangers, red fezzes and white flowing robes of various types, everything reminded one of the Far East rather than of Africa. On an elevation
immediately behind the town was an old ruined fort with crenelated walls and muzzle loading cannon still protruding through some of the ports. Still higher were the scattered homes of the important Europeans, most of them with commanding views of the sea.

After entry, the first order of the day was to meet with the French officials and the local fishermen in order to arrange for the purchase of a coelacanth, if one could be caught. In spite of Dr. Gordon's impassioned arguments in fluent French, he could win no reduction in the officially established price, and we are now committed to pay 50,000 Comoran francs for a dead coelacanth and 100,000 for a live one (about $200 or $400 U.S.). This may seem a steep price to pay for one fish regardless of size (we would prefer small ones), but considering the rarity of the species and the extraordinary interest throughout the world in this living fossil from the Mesozoic, it would be well worth it to gain some knowledge of its physiology, which is totally unknown at present.

Of course we have not been content to depend entirely on the native fishermen, although they include a man known as Zema who has already caught four coelacanths and should therefore know the technique. We have been busy with set long lines, with hand lines and with free deep-water fish traps, which, after a period of several hours on the bottom, are released by the solution of a magnesium link and float to the surface to be retrieved there. These links have taken much longer to dissolve than they were supposed to, and we have had some anxious hours during which we thought that we had lost our gear. However, they eventually popped up about a day late, and we still have our original four. As with any new operation with unfamiliar gear, we have had our trouble torn the traps, and made water hauls, but we have modified the gear and the technique of setting it, and we hope that our future catches will yield more significant results than the one magnificent vermillion shrimp from 1300 meters depth that represents our total catch so far.

While waiting for coelacanths to bite on our hooks or get into our traps, we have worked with more familiar gear; we have made some bathythermocasts occupied two hydrographic stations, and made a number of hauls with the Tucker trawl for organisms of the deep scattering layer. From these hauls a great many interesting forms have come on board, among them the rare "barrel-eye" fish (Opisthoproctus); the largest hatchet fish (Argyropelecus) that I have ever seen; large and perfect viper fish (Chauliodus) with dentition that would be the envy of a saber-toothed tiger; numerous representatives of genera (Idiacanthus, Malcosteus, Bathophillus, Astronesthes, Gonostoma, etc.) in related families
that are much rarer and scarcely less spectacular with their fearsome teeth, black color, chin barbles, and rows of light organs; big, transparent, ribbon-like, leptocephalus larvae of unknown eels; many bright red shrimps (Acanthephyra and related forms); an amphipod (Cystosoma) with a body as large as a golf ball and so crystal clear that it is absolutely invisible in water; large pelagic colonial tunicates (Pyrosoma) that, when stimulated with the finger, glowed with a bright cold light to justify their name, which means "fire body"; violet-brown jelly fish (Atolla) from the cold dark depths; big heteropods (Carinaria), pelagic snails with ridiculously small shells that swim with slow ungainly flapping motions and are so transparent that their eyes appear to be two detached black blobs. The roll call of fantastic, grotesque or beautiful forms is practically endless; we are getting a good impression of a world that most people scarcely know exists.

Some of these specimens that came up in fair condition have been placed in a refrigerated aquarium and are surviving surprisingly well. They are unique material for physiological experimentation. At present Dr. Inga Böetius is measuring the respiratory rate of crustaceans from the deep scattering layer—probably the first time that such an investigation has been attempted. Others are sacrificed for biochemical work. Dr. Malcolm Gordon and Dr. Jan Böetius have been processing muscle tissue from various deep-sea fishes for the determination of amino acids. The greater part of the catches are preserved for taxonomic and anatomical work by various specialists in shore laboratories at a later date.

The bottom falls off very steeply around this volcanic island and does not present ideal trawling ground. Even at 1300 meters the fathometer indicated about a twelve degree slope outward, but when we cruised parallel to shore the depth held even and there were no marked irregularities on the trace. We decided that it was worthwhile to try for a haul of deep bottom animals, so over went the beam trawl. Everything seemed to work fine until we got the line almost vertical in hauling in, and then the winch would simply not pull the trawl in. We were anchored. There was only one thing to do; we tried to break the gear loose by going slow ahead. Something gave alright, but it was not the obstruction on the bottom. When the end of the wire came in we found that we had snapped both of the wire cables of the net, and the trawl remained about three-quarters of a mile beneath the surface. In slight recompense for our loss, the fish traps set at the same depth have brought us a rare deep-sea shark (Euprotomicrus), a couple of conger eels, a number of large red prawns (some for science and some for food—and very good, too!), and a few small amphipods clinging to the remains of the bait.
Not all of our work has been in deep water. On Sunday, July 19th, we tried our luck on a fish-poisoning station on a reef close to shore. A vertical coral wall descended from about seven to twenty feet and was cut by a series of sharp little canyons. These provided good spots to spread the rotenone. The reef was not particularly rich, the water was rather murky with visibility limited to about twenty feet, but we were fairly successful, and everyone, particularly those to whom coral reefs were new and strange, enjoyed the adventure. We preserved a representative collection of colorful reef fishes, and Lorraine Morin, a lovely young student who is enamored of helminth parasites, had a wonderful chance to indulge in the pastime of pawing through fish anatomy for tape worms, flukes and such ilk. Strangely enough, she seemed to take a great delight in doing it. Such devotion to science should be encouraged and we shall have to see if she gets all the material that she wants.

On the evening of Monday, July 21st, we were excited to hear that a coelacanth had been caught at a town on the east coast about an hour away by car. One of the local entrepreneurs, who are always ready to arrange anything for a slight fee, took us to see the fisherman who had caught it and who just happened to be in town. After much flow of the Comoran version of Arabic, and its translation into French, we learned that the fish had been caught four days previously, that it was a bit longer than the man's arm, that it had been packed away in salt, that the body cavity had been opened and the internal organs preserved as well. It was not just what we wanted, but we thought that it should be looked at in any case with the possibility of purchase in mind. Accordingly it was agreed that we would pay for the transportation of the fish and the fisherman to Mutsamudu where we could see the specimen on the pier at 7:30 in the morning and decide what to do.

At the appointed time most of the scientific party, equipped with cameras, were on the pier, but there was no fish to be seen. We walked into the adjacent town square, and after a while our entrepreneur appeared to open his tiny shop. After waiting for some time for the fisherman, our helpful friend informed us that the fisherman would come to his home, so we all set out on a parade through ever-narrowing alleys which soon required us to walk in single file. At last we reached our guide's home and he talked to someone inside whom we did not see. Then we turned around and marched back and he talked to several people here and there, and finally, on the steps of the mosque he said that the fisherman had gone to the hospital. In desperation we got a "taxi," a truck with board seats on each side, and went to the hospital to find our man. They had never heard of him. What happened we still do not know for sure, but we
...
rather suspect that we have been given a Comoran run-around. Anyhow we returned to the ship and got to work once more.

We have been working very hard on this cruise, but there has been a chance to crowd in a few extracurricular activities. The day after our arrival was some sort of a local holiday, and that evening some of the ship's company went to a "bull fight," which was evidently not of the Spanish variety, but consisted of anyone who desired to do so worrying a distracted heifer at the risk of being knocked down. It provided a chance for mingling with the town folk. On Bastille Day, Dr. Gordon and I were invited to a "Sirop" given by the Mayor at the Palace of the Sultan. We figured it would be a dry Moslem affair, but there was a Moslem table with soft drinks and a European table with whisky and champagne. There were interesting pastries and tidbits for everybody. The palace was not an imposing building, but a bare and weather-worn block; the sultan was not present since he died some time in the thirties, but several of his relatives, resplendent in burnooses and full Arabian regalia, were there to enliven the party. It was a pleasant and interesting affair. One evening we all went to see an excellent under-water movie, the work of a French photographer who has been working in this area for some months. A number of people from the ship have been invited to dinner or for excursions on shore, and we have had numerous visitors on board. Everything is progressing normally.
The nicest diversion on Anjouan, as far as I am concerned, came on July 20th when Monsieur G. Mattias, of the Direction General de l'Agriculture, fulfilled his kind promise to take me into orchid country. Starting from Mutsamudu in his Land Rover, we drove along the north coast, then over a pass in the mountains and down again to the east coast, and along this almost to the southern end of the island. On this trek we covered most of the 40 km. or so of macadamized road on Anjouan, passing through commercial plantings of coconuts, ylang ylang (a tree grown for the essence of its flowers, which is used in perfume), sisal, bananas, cocoa and tea, as well as through forests, up mountains, down valleys with dashing streams, through villages and towns with stone or wattle walls and thatched or tin roofs lining streets barely wide enough to get through, which were crowded with people and goats and chickens. At last we turned off on a dirt road that twisted and climbed ever higher to provide a series of spectacular views of mountains and sea, until we came at last to an agricultural experimental station. Here we abandoned the Land Rover as unfit for the narrow, steep and rough trail ahead, and transferred to a jeep. Soon we left the bright warm sunshine and plunged into an eerie world of cloud at an elevation of about 2500 feet. The change in temperature was dramatic; five minutes previously we had been hot and sweaty; now it was definitely chilly. Visibility was cut to about one hundred feet by the dense fog, through which came a steady light drizzle that now and again turned into brief heavy downpours. Even here in these mountains, which from a distance seemed to be clothed in virgin jungle, a continual trickle of people on foot proclaimed that the overpopulation problem is not restricted to the better known areas of the globe; bananas were planted on the steep hillsides, and cattle tethered here and there showed the jungle not to be as untouched as I had supposed. In fact, the larger trees that had not been cleared away were fairly widely scattered. The dripping clouds and soggy ground provided a perfect habitat for ferns, mosses, liverworts and orchids, both epiphytic and terrestrial. They grew everywhere in this somber green and grey dream-world. While only two species of orchids, a beautiful white Angraecum and a hardly less striking pink Spathoglottis, were in bloom, I had no difficulty in collecting at least fourteen different kinds to gladden the hearts of the botanists at the University of California--and my own as well.

On Thursday, July 23rd, we picked up our long line and fish traps for the last time on this visit and in the afternoon set sail for Nossi Bé to replenish fuel, water and provisions. Under a spanking breeze the start was auspicious, with the ship heeled far over and streaking along
with a very satisfactory bone in her teeth. Unfortunately, the wind began to fail within minutes, and that night the mainsail was furled and the engine started once more. After an uneventful crossing we arrived at Hellville on the afternoon of Saturday, July 25th, to be greeted by the personnel of the Laboratory with a welcome-back party featuring an elaborate buffet. Satisfying the inner man was only a part of the program which included dancing, guitar strumming by Kelly Blackburn, our marine technician, folk singing by all who thought they had voices, and the uninhibited practice of French-English conversation by everyone. It is amazing how effectively un peu words avec gestures and smiles can break down language barriers.

We immediately launched a collecting campaign for experimental animals (mud skippers, the crab Cardisoma, fresh-water portunids, small shrimps from the mud flats) and settled down to the busy routine of physiological investigations and evening lectures or seminars. That has been the established practice on this cruise. The students are now contributing to the seminar program, as well as to the field and laboratory work. Those who are far advanced in their graduate research report on their own investigations; those who are relative neophytes discuss some phase of their special field of interest or review one or more scientific papers. The accompanying comments, with everyone participating, are often free-wheeling, and sometime the give and take gets a little out of hand, but this is all to the good. For example, the other evening Rosemary McCarthy's discussion of the role of cytochrome-C as a taxonomic tool developed into a shouting, table-thumping argument over scientific methods, scholarship and ethics, and lasted far beyond the allotted hour. It was accompanied by dark looks, harsh words, snide remarks and much glee—a really stimulating free-for-all. In the end general agreement was reached and peace settled down once more without any residue of hard feelings.

The routine work has been interrupted several times by activities of a different character. Leaving a number of people behind to carry on experiments in progress, a number of us took the whale boat and made the twenty-plus mile crossing to the mainland of Madagascar in order to collect fresh-water fishes. Our visit to the native village was interesting, we found a lovely spot for our picnic beside a shaded stream where pools alternated with riffles, the bird watchers among us had a fine time ogling sunbirds (Nectarinia) and brilliant blue kingfishers (Alcedo cristata), drongos (Dicrurus) and herons (Ardea idae), crested terns (Thalasseus bergii) and tropic birds (Phaethon), we took about twenty-five species of fresh and brackish-water fishes, including the strange eel-like blind goby Taeniogobius, and in general had a fine time, but we paid for it with seven hours of rough, wet and uncomfortable travel over and back.
Another day we moved the ship to Tanikely, a small island about seven miles away, and explored the island and the surrounding reefs. The coral in the western Indian Ocean is not as rich and varied as it is in the East Indian region, but it is good enough to evoke admiration from our scientific party, only two of whom have been lucky enough to have worked in more spectacular areas. The gorgonians, on the other hand, leave nothing to be desired. At depths of forty to sixty feet we swam leisurely among tremendous brown sea fans, fantastic red shrubs, long black rope-like tendrils, and ridiculous tufts of blue fingers. We explored this submarine playground and noted the clams and cowries, the star fishes and sea cucumbers, the nudibranchs and flatworms, while all around us unconcerned colorful fishes displayed themselves, and an occasional large turtle paddled slowly away. We speared a few of the fishes and got one large purple-blotched sting ray (Dasyatis brevicaudatus) about four feet across. Unfortunately, the current in this area was so strong that an attempted poison station was an almost complete failure.

One day, while at anchor, a six-foot cub shark (Carcharhinus leucas) took the bait and provided some excitement in the landing. We got two remoras (Echeneus naucrates) along with it, and Lee Morin had a chance for more tapeworms and flukes.

While we keep pretty busy there have been occasions for relaxation and recreation that have nothing to do with marine biology. There was the party that we gave for the people at the shore laboratory in slight repayment for their many courtesies to us. There was the early morning visit to the nearby National Forest Reserve to see the lemurs. We spotted approximately a dozen of them at a distance of only about twenty yards. They grunted and growled at each other, or possibly at us, swung their long tails, set the branches swishing by spectacular leaps from tree to tree, and stared at us through big round eyes in the uncertain light of dawn, apparently as interested in humans as we were in lemurs. There was the visit to the factory where the essence of the ylang ylang flowers is distilled for the perfume market. There was the basketball game between a team from TE VEGA and one from Hellville. Due, perhaps, more to our greater stature than to superior finesse, TE VEGA won by eight points! There was the superb dinner provided for the Captain and Senior Scientists by Dr. and Madame Pichon, the Sunday picnic on the beach at the northwest tip of Nossi Bé, the enjoyment of the blooming coffee plantations where for a few brief days the delicate pure white flowers were marshalled in ranks of military precision along each branch to form a striking contrast to the dark green leaves. Everyone has had the opportunity to sample, on more than one occasion, the flavor of this pleasant and exotic place, and to enjoy the generous hospitality of the resident population.
Our work in Nossi Bé was finished and we were due to depart for the Comoro Islands on August 10th, but, with the indifference to breaking promises so characteristic in this part of the world, the tanker did not deliver the water and fuel we needed until late on August 12th. On the morning of the 13th we sailed with a good supply of mudskippers and crabs to keep the scientific party busy.

Shortly after I had turned in that night, Dr. Gordon rousted me out again. He reported that a school of fish was following the ship just at the leading edge of the illuminated cone thrown by our stern light on the water. Flashes of bioluminescence along the edge of the light certainly made it appear that this was the case, and since the wake of the ship was not particularly bright it seemed that the fish themselves must be emitting the light at intervals. After admiring the display for a time, we tried shining a flashlight into the water ahead of the line of fire, and were rewarded by more flashes that faded in about two or three seconds. We were not being patrolled by fishes but were sailing through a dense swarm of animals that were stimulated to glow briefly by the energy of a light beam. Each glow seemed to indicate an organism about the size of a cigarette package. We tried to catch some by means of a dip net, but fire streamed out of the end of it, and when the net was brought on board it contained only some phyllosome larvae, small amphipods and fragments of jelly that would not glow. The light producers were probably ctenophores or siphonophores so fragile that they passed through the meshes like custard. After making twenty-seven stop-watch determinations of the duration of the glow after both long and short stimulation (1.4-4.1 seconds, with a 2.3 second average), we suddenly left the unknown organisms behind and were left with only the memory of an interesting and beautiful phenomenon. It was only after they were gone that we thought of trying to stimulate them by means of sonar. That is a project for the next opportunity.

[Signature]
International Indian Ocean Expedition

Cruise B of the R/V TEVega February - May 1964; Colombo, Ceylon to Port Louis, Mauritius

Report of participation and field notes of:
Harold E. Hackett, phycologist
Department of Botany
Duke University
Durham, North Carolina

Total number of collecting stations - 41
ship stations (dredged or planktonic material - 10)
shore stations
  littoral and tidepool material - 13
  sublittoral reef material - 18

Nature of collections: Representatives of all species of algae and marine vascular plants from each station were collected so far as was possible.

Station numbers: Where the following collecting stations corresponded with official expedition stations, the official collection number follows the algal collecting number.

Field Notes: No attempt will be made at the present time to list the specimens collected. Little identification was done on ship board.

SHIP STATIONS

1A. 3-15-64 between Ceylon and the Maldive Islands, Lat. 6 10'N, Long. 77 58'E, 18:00, Pelagic Sargassums

1B. -120. 3-22-64, Maldive Islands, Male Atoll Lagoon, Lat. 4 32-35' N, Long. 73 34'E, 11:00, 6' beam trawl, 30-33 fathoms.

1C. -122A. 3-25-64, Maldive Islands, Fadiifolu Atoll, East of Loli and Lowalafuri Islands, Lat. 5 20'N, Long. 73 29'E, 16:00, 6' wire dredge, 25-35 fathoms.

1D. -122B. 3-25-64, Maldive Islands, across the SW boundary of Fadiifolu Atoll Lagoon, Lat. 5 18'N, Long. 73 29'E, 18:30, 6' beam trawl, 25-35 fathoms.

1E. 3-27-64, Maldive Islands, Miladummadulu Atoll Lagoon, 200 yards W of Kendikolu Island, Lat. 5 57'N, Long. 73 24'E, 15:00, 2' wire dredge, 25 fathoms.

1F. -124. 3-29-64, Maldive Islands, Miladummadulu Atoll Lagoon, Lat. 5 58'N, Long. 73 19'E, 11:30, 6' beam trawl, 36 fathoms.
10. 4-1-64, W of extreme southern tip of India, edge of the
discolored water, 13:30, plantonic Chrysophyta inconvergence
lines

1H. 4-11-64, India, mouth of Cochin Harbor, plantonic Chrysophyta.

1I. 4-21-64, Maldive Islands, N Malosmadulu Atoll Lagoon
near Ongu Island, Lat. 5°41'N, Long. 73°0'E, 15:00, 2 f
wire dredge, 22 fathoms.

1J. 5-5-64, Maldive Islands, Addu Atoll Lagoon, just N of Gan
and Fedu Islands, Lat. 0°41'S, Long. 73°9'E, 8:00, 2 f wire
dredge, 20-25 fathoms.

SHORE STATIONS

Littoral and tidepool Collections:

3A. 2-15-64, Mount Lavinia, Ceylon, Gneiss rock in heavy surf.

3B. 2-21-64, Colombo, Ceylon, at the Galle Face Hotel, rock
in heavy surf.

3C. 2-21-64, Mount Lavinia, Ceylon, one-half mile off shore
near top of reef.

3D. 2-27-64, Mount Lavinia, Ceylon, one-half mile off shore
near top of reef.

3E. 2-28-64, Beruwala, Ceylon, 11:00, exposed reef surface in
surf.

3F. 3-1-64, Colombo, Ceylon, at the Galle Face Hotel, 9:00,
beach and Sabellariid rock in surf.

3G. -115. 3-4-64, Galle, Ceylon, S side of Fort wall, 10:00,
on Granitic rock and coral debris.

3I. -117. 3-17-64, Maldive Islands, Male Atoll, Dunidu Fa_ro
Lat., 4°11'30"N, Long. 73°30'15"E, beach rock.

3H. 3-7-64, Hikkaduwa, Ceylon, 14:00, beach rock flat.

3J. -118. 3-19-64, Maldive Islands, Male Atoll, Imma Island,
Lat. 4°18'30"N, Long. 73°34'E, grass flats.

3K. 3-31-64, Maldive Islands, Tiladummati Atoll, Filadu Island,
Lat. 6°55'N, Long. 73°19'E, 10:00, a coral rubble pool at the
dge of the island reef.

3L. 4-28-64, Maldive Islands, Addu Atoll, Gan Island, Lat. 0°41'S,
Long. 73°9'E, beach rock.
3N. 4-19-64, Maldive Islands, Male Atoll, Dunidu Faro, Lat. 4° 11' 30"N, Long. 73° 30' 15"E, beach rock scrapings.

Reef and Sublittoral Collections:
2A. -117. 3-17-64, Maldive Islands, Male Atoll, Dunidu Faro, Lat. 4° 11' 30"N, Long. 73° 30' 15"E, 4-10' water, coral reef.

2B. -119. 3-21-64, Maldive Islands, Male Atoll, Imma Island Lagoon, Lat. 4° 18' 30"N, Long. 73° 34' E, water Temperature = 31.1° C, scattered coral patches in 1-2' water.

2C. 3-22-64, Maldive Islands, Male Atoll, Kagi Island, Lat. 4° 40' N, Long. 73° 29' 40" E, coral reef in 5' water.

2D. 3-23-64, Maldive Islands, Fadifolu Atoll, channel between Maro and Mafilefuri Islands, Lat. 5° 21' 30"N, Long. 73° 25' 24" E, 15:00, 2' deep, sand and coral rubble in current.

2E. -121. 3-24-64, Maldive Islands, Fadifolu Atoll, channel between Maro and Mafilefuri Islands, Lat. 5° 21' 30"N, Long. 73° 25' 24" E, algal turfs from dead corals and mangrove roots.

2F. 3-27-64, Maldive Islands, Miladummadulu Atoll, Kendikolu Island, Lat. 5° 57' N, Long. 73° 24' E, coral reef in 12' water.

2G. 3-28-64, Maldive Islands, Miladummadulu Atoll, Kendikolu Island, Lat. 5° 57' N, Long. 73° 24' E, patch reef in 2' water.

2H. 3-31-64, Maldive Islands, Tiladummati Atoll, Filadu Island, Lat. 6° 55' N, Long. 73° 10' E, 10:00, coral reef in 15' water.

2I. 4-1-64, Maldive Islands, Male Atoll, Dunidu Faro, Lat. 4° 11' 30"N, Long. 73° 30' 15"E, coral reef in 3' water.

2J. -129. 4-21-64, Maldive Islands, North Malosmadulu Atoll, Ongu Island, Lat. 5° 41' N, Long. 73° 0' E, coral reef in 3-10' water.

2K. -130. 4-22-64, Maldive Islands, Ari Atoll, Nameless Island, Lat. 4° 6' N, Long. 72° 45' E, reef in 5' water.

2L. -132. 4-24-64, Maldive Islands, South Nilandu Atoll, Wala Faro Lat. 2° 42' N, Long. 72° 55' E, coral reef in 4' water.

2M. 4-23-64, Maldive Islands, South Nilandu Atoll, Kuda Huvaadu Island, Lat. 2° 42' N, Long. 72° 55' E, surf collection.

2N. 4-30-64, Maldive Islands, Addu Atoll, Wilingili Island, Lat. 0° 41' S, Long. 73° 11' E, water temperature 29.2° C, coral reef in 2' water.

20. 5-4-64, Maldive Islands, Addu Atoll, Gan Island, Lat. 0° 41' S, Long. 73° 10' E, 3' water, rubble near pier.
Distribution of the Collections:

The marine grasses will be sent to Dr. Edward Chin, Woods Hole, and members of the genus Halimeda to Dr. L.H. Collinvaux, Yale University. The algae of the Maldive Islands will be used in the preparation of a thesis by this participant. The remaining collections will be studied in a similar manner after the preparation of the primary paper.

Deposit of Specimens:

Collections have been made so that several sets should be available. In following the recommendation of the committee on algae at the conference on the Sorting Center of the Smithsonian, one collection will be deposited in the National Museum, including paratypes or co-types of new species. Another set will be deposited at the herbarium of the Department of Botany, Duke University.

Additional Collections:

One hundred twenty-five specimens of land vascular plants, Bryophytes, and Lichens were made for the herbarium of the Department of Botany, Duke University.